WHAT IS CLAIMED IS:

1. A pharmaceutical composition for use in treating cancer comprising, as active ingredients, a fusion protein dimer comprising an IL-2 variant and a CD80 fragment; and an immune checkpoint inhibitor,

wherein the fusion protein is represented as following structural formula (I):

N′-X-[linker (1)]n-Fc domain-[linker (2)]m-Y-C′(I)

wherein,

N′ is the N-terminus of the fusion protein,

C′ is the C-terminus of the fusion protein,

X is the CD80 fragment, wherein the CD80 fragment is an extracellular domain of CD80 protein,

Y is the IL-2 variant comprising substitutions of R38A and F42A in the amino acid of SEQ ID NO: 10,

the linker (1) is a peptide linker consisting of 30-40 amino acids,

the linker (2) is a peptide linker consisting of 5-15 amino acids,

n and m are 1,

and wherein the immune checkpoint inhibitor is at least one selected from the group consisting of anti-PD-1 antibody, anti-PD-L1 antibody and anti-TIGIT antibody.

2. The pharmaceutical composition for use in treating cancer according to claim 1, wherein the extracellular domain of CD80 consists of the 35^{th} to 242^{nd} amino acids of SEQ ID NO: 11.

3. The pharmaceutical composition for use in treating cancer according to claim 1, wherein the fusion protein has the amino acid sequence of SEQ ID NO: 9.

4. The pharmaceutical composition for use in treating cancer according to claim 1, wherein the anti-PD-1 antibody is any one selected from the group consisting of pembrolizumab, nivolumab, cemiplimab, JTX-4014, spartalizumab, camrelizumab, sintilimab, tislelizumab, toripalimab, dostarlimab, INCMGA00012, AMP-224, and AMP-514; or

the anti-PD-L1 antibody is any one selected from the group consisting of atezolizumab,

avelumab, durvalumab, KN035, CK-301, AUNP12, CA-170, and BMS-986189.

5. The pharmaceutical composition for use in treating cancer according to claim 1, wherein the cancer is any one selected from the group consisting of gastric cancer, liver cancer, lung cancer, colorectal cancer, breast cancer, prostate cancer, ovarian cancer, pancreatic cancer, cervical cancer, thyroid cancer, larynx cancer, acute myeloid leukemia, brain tumor, neuroblastoma, retinoblastoma, head and neck cancer, salivary cancer, and lymphoma.

6. A use of a fusion protein dimer comprising an IL-2 variant and a CD80 fragment; and an immune checkpoint inhibitor in the manufacture of a medicament for treating cancer,
wherein the fusion protein is represented as following structural formula (I):
N′-X-[linker (1)]n-Fc domain-[linker (2)]m-Y-C′(I)
wherein,
N′ is the N-terminus of the fusion protein,
C′ is the C-terminus of the fusion protein,
X is the CD80 fragment, wherein the CD80 fragment is an extracellular domain of CD80 protein,
Y is the IL-2 variant comprising substitutions of R38A and F42A in the amino acid of SEQ ID NO: 10,
the linker (1) is a peptide linker consisting of 30-40 amino acids,
the linker (2) is a peptide linker consisting of 5-15 amino acids,
n and m are 1,
and wherein the immune checkpoint inhibitor is at least one selected from the group consisting of anti-PD-1 antibody, anti-PD-L1 antibody and anti-TIGIT antibody.

7. A pharmaceutical composition for use in treating cancer comprising a fusion protein dimer comprising an IL-2 variant and a CD80 fragment as an active ingredient, wherein the fusion protein dimer is to be administered in combination with an immune checkpoint inhibitor, wherein the fusion protein is represented as following structural formula (I):
N′-X-[linker (1)]n-Fc domain-[linker (2)]m-Y-C′ (I)
wherein,
N′ is the N-terminus of the fusion protein,

C′ is the C-terminus of the fusion protein,

X is the CD80 fragment, wherein the CD80 fragment is an extracellular domain of CD80 protein,

Y is the IL-2 variant comprising substitutions of R38A and F42A in the amino acid of SEQ ID NO: 10,

the linker (1) is a peptide linker consisting of 30-40 amino acids,

the linker (2) is a peptide linker consisting of 5-15 amino acids,

n and m are 1,

and wherein the immune checkpoint inhibitor is at least one selected from the group consisting of anti-PD-1 antibody, anti-PD-L1 antibody and anti-TIGIT antibody.

8. A pharmaceutical composition for use in treating cancer comprising an immune checkpoint inhibitor as an active ingredient, wherein the immune checkpoint inhibitor is to be administered in combination with a fusion protein dimer comprising an IL-2 variant and a CD80 fragment,

wherein the fusion protein is represented as following structural formula (I):

N′-X-[linker (1)]n-Fc domain-[linker (2)]m-Y—C′ (I)

wherein,

N′ is the N-terminus of the fusion protein,

C′ is the C-terminus of the fusion protein,

X is the CD80 fragment, wherein the CD80 fragment is an extracellular domain of CD80 protein,

Y is the IL-2 variant comprising substitutions of R38A and F42A in the amino acid of SEQ ID NO: 10,

the linker (1) is a peptide linker consisting of 30-40 amino acids,

the linker (2) is a peptide linker consisting of 5-15 amino acids,

n and m are 1,

and wherein the immune checkpoint inhibitor is at least one selected from the group consisting of anti-PD-1 antibody, anti-PD-L1 antibody and anti-TIGIT antibody.